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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,172	07/08/2003	Mamoru Okamoto	16819	8615
23389	7590	09/19/2005	EXAMINER	
SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530			DUDEK, JAMES A	
			ART UNIT	PAPER NUMBER
			2871	

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/615,172	Applicant(s) OKAMOTO ET AL.	
	Examiner James A. Dudek	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
 4a) Of the above claim(s) 15-21 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-10, 22 and 23 is/are allowed.
- 6) ☒ Claim(s) 11 and 13 is/are rejected.
- 7) ☐ Claim(s) 12 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over 822 in view of 6657689 ("689").

822 teaches a LCD comprising a first substrate including a plurality of signal electrodes being arranged in parallel to one another along a first direction [205 and 201], a plurality of scanning electrodes being arranged parallel to one another along a second direction orthogonal to said first direction [202] and a plurality of pixel regions each having a pixel electrode being place in one-to-one correspondence to an intersection between each of said signal electrodes and each of said scanning electrodes [I]; a second substrate [161]; a liquid crystal layer inserted between said first substrate and said second substrate [see column 2, 2nd full paragraph]; a backlight source to feed light to said liquid crystal layer [see column 1] and wherein each of said pixel regions includes a reflective region having a reflective film to receives ambient light from an outside and to display in a reflective manner while being in a reflective display mode [electrode 207], and a transmissive region having a transmissive electrode film to allow light from said backlight source to be transmitted to display in a transmissive manner at time of operations in a transmissive display mode [207b], said transparent electrode film in the transmissive display

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mode serving as said pixel electrode [207b] and said reflective film in the reflective display mode serving as said pixel electrode [207a]; and wherein in each of said pixel regions, said transparent electrode film is extended to said reflective film in a manner to cover at least one part of said reflective film [see figure 2b].

822 lacks the different gap space for reflective regions. However, 689 teaches a different gap thickness for reflective regions in a transfective display. It would have been obvious to one of ordinary skill at the time of invention combine the 689s different gap thickness structure with 822 to improve the color fidelity of the cell.

Regarding, the cell gap layer being selected based upon twist. If not explicitly in the related art section of 689 it was inherent. The following are excerpts from 689.

Accordingly, the transparent electrode 50 and the reflective electrode 19b serve as a pixel electrode. Moreover, this structure makes different cell gaps d_1 and d_2 between the common electrode 13 and the pixel electrode (the reflective electrode 19b and the transparent electrode 50). d_1 denotes the first cell gap between the common electrode 13 and the reflective electrode 19b while d_2 denotes the second cell gap between the common electrode 13 and the transparent electrode 50.

(21) On the other surface of the lower substrate 21, a lower quarter wave plate 54 and a lower polarizer 52 are formed in series. Moreover, a backlight device 41 is arranged below the lower polarizer 52.

(22) In a homogeneous liquid crystal or twisted nematic (TN), its molecules are oriented in the vertical direction when a voltage is applied ($V_{on}=5V$) and used as a liquid crystal layer 23. When an optical retardation $\Delta n d_1$ of a first cell gap is $\lambda/4$ ($\lambda=550\text{ nm}$) and a second cell gap d_2 is twice as large as the first cell gap d_1 as described by equations (1) and (2), an optical retardation $\Delta n d_2$ of the second cell gap is shown in equation (3).

$$(1) \Delta n d_1 = \lambda/4 \quad (1)$$

$$(2) d_2 \approx 2 \Delta n d_1 \quad (2)$$

$$(3) \Delta n d_2 = \lambda/2 \quad (3)$$

(23) In the above equations, Δn is birefringence, d_1 denotes the first cell gap between the reflective electrode and the common electrode, d_2 denotes the second cell gap between the transparent electrode and the common electrode λ is the wavelength of the light, and $\lambda/4$ is a phase shift value of the light when the light passes through a reflective portion of the liquid crystal layer 23 between the common electrode 13 and the reflective electrode 19b at once. $\lambda/2$ is a phase shift value of the light when the light passes through a transparent portion of the liquid crystal layer between the common electrode 13 and the transparent electrode 50 at once.

(24) Accordingly, the optical retardation $\Delta n d_2$ of the second cell gap d_2 , as shown by equation (3), is $\lambda/2$ ($\lambda=550\text{ nm}$). In the reflective mode, the ambient light passes through the liquid crystal layer 23 twice, i.e., as the ambient light is reflected by the reflective electrode 19b.

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(25) As mentioned above, since different cell gaps (the transparent portion and the reflective portion) are formed in the liquid crystal layer 23, there is no difference in the optical retardation of light passing both through the transparent portion and through the reflective portion.

(26) FIG. 3 shows a liquid crystal orientation in cases that the voltage is applied and not applied. As shown, molecules of the liquid crystal layer 23 are arranged in the horizontal direction along the upper and lower substrates 13 and 21 when the voltage is not applied. On the other hand, the molecules are arranged in the vertical direction perpendicular to the upper and lower substrates 13 and 21 when the voltage is applied. However, in the ON-state, the molecules close to the upper and lower substrate 13 and 21 are not oriented properly because of an anchoring energy generated between the liquid crystal molecules and each substrate.

(27) Therefore, the liquid crystal layer 23 derives characteristics of birefringence because the liquid crystal molecules are not properly oriented. Namely, a residual optical phase retardation can exist because of unchanged orientation or alignment of some of the liquid crystal molecules that are close to the upper and lower substrates 13 and 21. These cause the light leakage in a dark state of the LCD device.

(28) In general, in case of the TN liquid crystal that has a twisted angle of 90 degree, molecules detached from the upper and lower substrates are mostly arranged perpendicular to the pair of substrates when the voltage is applied since these molecules are not affected from the anchoring energy. Moreover, the molecules close to the pair of substrates are not arranged in the vertical direction. Thus, the orientation direction of the TN liquid crystal molecules close to the upper substrate are arranged perpendicular to that of the molecules close to the lower substrate. As a result, an optical effect of the TN liquid crystal is offset each other.

(29) However, in case of the homogeneous liquid crystal that has a twisted angle of 0 degree as shown in FIG. 3, these molecules close to the upper and lower substrates 13 and 21 affect the optical effect of the liquid crystal layer 23. This is because an orientation direction of the molecules located close to the upper substrate 13 are parallel to that of the molecules around the lower substrate 23.

Without being too repetitive, 689 shows a link between the twist angle and having different cell gaps. Because Δ nd or retardance of the liquid is based on twist as well as the thickness and the birefringence of the liquid crystal. Specifically 689 considers a TN cell (90 degree twist) or a cell have 0 degree twist. In either case, the gap is adjusted to ensure the same retardance when light passes or is reflected by the cell. That is, one must consider all characteristics of the liquid crystal including twist when selecting the gap difference.

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Allowable Subject Matter

Claims 12 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This is based on the passive configuration claimed in claim 1 not an active configuration.

Claims 1-10 and 22-23 are allowed.

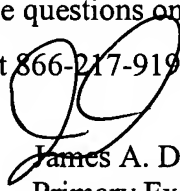
Response to Arguments

Applicant's arguments with respect to claims 11 and 13 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Dudek whose telephone number is 571-272-2290. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James A. Dudek
Primary Examiner
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